TESTIMONY OF THE INTERNATIONAL CODE COUNCIL
TO THE
COMMITTEE ON SCIENCE
U.S. HOUSE OF REPRESENTATIVES

IN THE MATTER OF

NIST'S INVESTIGATION OF THE WORLD TRADE CENTER COLLAPSE:
WHAT ARE THE LESSONS LEARNED AND HOW ARE THEY BEING APPLIED
TO IMPROVE BUILDING SAFETY

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Good morning Mr. Chairman and distinguished members of the committee. It is a pleasure to be here today to discuss the role of building codes and standards in protecting the public through enhanced measures in building safety.

I am Henry Green, President of the International Code Council (ICC). Through my testimony I hope to discuss how the NIST recommendations can be employed in improving building safety across the country, as well as leave you with a broader understanding of how ICC is protecting health, safety and welfare by creating better buildings and safer communities. Certainly the subject of today's hearing and the ICC's mission is well-aligned. Aside from my elected position with ICC, I also serve as the Director of The Bureau of Construction Codes and Fire Safety for the State Of Michigan.

I am participating in today's hearing to specifically address the implementation of the lessons learned from the world trade center (WTC) collapse. In more general terms my comments also apply to and stress the need for increased collaboration between federal, state and local government in the development, adoption and implementation of codes and standards to enhance the safety and performance of new and existing buildings.

As a matter of background, I have been involved with building codes and standards development, adoption, implementation and enforcement issues at the international, national, state and local level for almost 30 years, serving not only ICC but such organizations as the National Institute of Building Sciences (NIBS), of which I serve as Past President. Briefly, before I speak to the questions the Committee has asked me to address, I will lay a foundation for a better understanding of ICC's responses to those three specific questions.

State and local government have relied on nationally recognized model codes, and the standards referenced in those codes, as a basis for their building construction regulations for almost 100 years. Initially many state and local government agencies wrote their own "home grown" provisions but over time they began to rely more and more on one of four regional model codes (the BOCA National Code, the ICBO Uniform Code and SBCCI Standard Code and the National Building Code of the American Insurance Association). The AIA ceased maintenance of its model code almost 30 years ago and just recently the three other model code organizations merged to form the International Code Council (ICC). The merger of the three regional organizations came at the urging of public and private sector interests seeking a single nationally uniform model building code developed through a voluntary consensus process. The development of one family of model codes by the ICC, which in turn reference standards from hundreds of building standards developers such as ASCE, ASME, and ASTM, has provided state and local government with a single national consolidated family of model codes upon which to base commercial and residential building construction and fire safety regulations. It has also given the federal sector a platform upon which to transition from government developed standards to voluntary standards, as directed by OMB Circular A119 and the National Technology Transfer and Advancement Act of 1995.

Today the majority of state and local agencies adopt building and fire codes developed and maintained through the governmental consensus process facilitated by the ICC. Think of these model codes as a coordinated set of

provisions that bind separate and distinct building component standards so they can fully address the technical and administrative aspects of building safety and performance. In most states I-Code based building codes are required and enforced as a function of state-level authority. In others, such as Tennessee, Maryland, Colorado and Illinois, the authority to adopt and enforce codes primarily resides with local government, and in those states most all local governments adopt ICC model codes to guide residential and commercial construction.

In parallel to the events leading up to the formation of the ICC and development of the ICC codes, the federal executive and legislative branches of government established the groundwork for the federal sector to increasingly base their building regulations on nationally recognized model building codes as opposed to writing their own unique provisions. As a matter of national policy, established through OMB Circular A-119 and the NTTAA, all federal agencies are encouraged to use codes and standards developed in the voluntary sector and, equally important, to participate in the voluntary sector code and standards development processes. This policy eliminates the duplication of effort and conflict in application that occurred when federal agencies developed and maintained unique government standards. This policy also enhances voluntary sector standards development by infusing those processes with the experience and resources of federal agencies such as NIST.

This federal policy also saves time and money and ensures consistency between public and private sector construction. Such consistency is important to designers, contractors, manufacturers, and other entities doing business with both the private and public sectors. Consistency is also imperative where the structure in question is a private sector facility that is leased to a federal agency. Such a facility must concurrently satisfy federal as well as state and local building requirements. Most importantly, federal sector use of voluntary sector codes and standards allows for public-private partnerships that can bring the result of building research and experience to bear on revision and enhancement to those codes and standards. Such is the case with the NIST investigations associated with the WTC.

In summary, what not too long ago was a “crazy quilt” of differing federal, state and local requirements, each supported by separate and distinct educational and other programs, has become a tapestry with a singular foundation that involves public and private sector interests and allows for unique federal, state and local threads without compromising the quality of the fabric of the tapestry.

As we are all focused on disaster response I would also like to take a moment to address concerns regarding construction codes and standards as they relate to the recent disasters resulting from Hurricanes Katrina and Rita. As demonstrated in the hurricane that struck Florida last year and from earlier high wind events that have caused devastation in the US, we have learned that compliance with codes and standards provides benefits in securing the safety of the public in the built environment, as well as reducing mitigation costs in recovery following these events.

ICC has pledged to work with both federal and state agencies in assisting in the recovery and rebuilding efforts in the Gulf region. We believe our effort will assist in providing a higher level of safety not only from such devastating events as hurricanes but in prevention of fires and other situations that plague our built environment. When codes and standards are used effectively, we know that for every dollar spent in prevention we gain a residual of 3 dollars in savings in recovery cost.

We will be providing a resource office in the Gulf Region to assist in the rebuilding efforts by furnishing local governmental and code officials with the resources they need to assure the reconstruction is completed to a standard that will assist in minimizing damage and recovery cost.

Given our experience and the working relationship we maintain with federal agencies, we would like to expand our relationship and further develop safety provisions for the protection of America’s citizens

In addition to responding to the questions regarding the NIST WTC report that the committee put to the ICC it was asked that in my testimony I provide the committee with a brief description of the code development process used by the membership of the ICC to build and maintain each of the 14 model codes, and with an understanding of how and where the model codes are adopted by authorities having jurisdiction over the adoption and enforcement of regulations impacting building design, construction and maintenance.

The widespread national application of the IBC and other ICC codes is due in large part to the recognition of respect for the voluntary consensus process by which the codes are developed. They are developed in a democratic process with input and advocacy from both private and public sector building and fire safety interests and any other interested or affected party. ICC's governmental consensus process adheres to the guiding principles at the national and international level for development of consensus documents. These principles - openness, transparency, balance of interest, due process, consensus and process of appeals are embodied in the governmental consensus process. The uniquely notable quality of the governmental consensus process is that it leaves final determinations on code provisions in the hands of public safety officials, who, like myself, are charged with representing the public interest and have no commercial interest associated with the outcome the process.

In this process any interested party can submit a change to the codes or request that a new code be developed. All submittals are published and made available for public review. All submittals are then published and made available for written comment and discussed at nationally noticed public hearings. At the first public hearing a committee of balanced interests listens to all testimony, reviews all information submitted on each proposal, then votes to recommend approval, rejection or approval with modification. If any party at the hearing disagrees with

the committee recommendation the process provides for action by those at the hearing to make and democratically act on a proposal for a substitute motion.

The results of the first hearing, both the committee recommendation and any substitute assembly action are published and disseminated in print and electronic form. Anyone can then submit a public comment on those results and provide documentation supporting a different outcome. The committee recommendation and additional public comment is again published and becomes the basis for the agenda of a final action hearing at which time the proposed changes and public comment are considered. At the final action hearing the final vote on code content is made by public safety officials, which, not unlike the legislative and regulatory processes used to establish federal law and regulations, is made by federal, state and local government representatives who represent the public at large.

The IBC and other ICC codes are used by federal, state and local government to ensure building safety through the adoption, implementation and enforcement of these codes. Nearly every federal, state and local agency that enacts building codes has adopted the IBC as the basis for jurisdictionally controlled building laws and regulations. Jurisdictional adoption occurs through legislative or regulatory action that cites or directly incorporates the IBC and may also include amendments that specifically tailor the code to the needs of the adopting agency or jurisdiction. For instance, the US Department of State adopts the IBC as a basis for US Embassy construction worldwide but then adds provisions to address security needs unique to a US diplomatic facility.

States such as Michigan, Minnesota, Maryland, Washington, New York, Oregon, North Carolina and Utah have authority in the executive branch of government to develop and adopt a statewide building code and do so, again with amendments that tailor the IBC to address unique geographic and climatic issues and differing legal and administrative environments. In states without authority to adopt statewide codes, or where local governments are not required to adopt the state code, the state adopts codes for state-owned buildings and leaves regulation of

private sector construction to local government. This is the case in states such as Tennessee, Colorado and Illinois with local government having the authority to adopt codes and Maryland that has a state code but does not have preemptive authority to mandate local government action to adopt and enforce the code. Just as is the case with state adoption, local adoption is effected through local elected bodies or regulatory agencies.

Subsequent to adoption, the IBC is used to ensure building safety through a number of mechanisms, each of which are focused on ensuring that the requirements of the code are actually adhered to in the construction of the building. Adoption of the code can be viewed as establishing a speed limit for highway travel. Though the limit is set, it is meaningless unless the limit is posted and enforced to ensure traffic safety. So too, federal, state and local agencies have ways to ensure code compliance and, as a result, building safety. Note that the IBC not only contains design and construction requirements but also a number of administrative criteria associated with inspection to ensure compliance in the field.

In the case of an agency that adopts the IBC and is also the building owner - such again as the US Department of State, or state or local government agency responsible for state or local owned construction - the adopting agency enforces the code and typically does so as a function of the contracting process that governs the building design and construction. The contractor is responsible for compliance and may be subject to inspection from the authorizing governmental agency, may be subject to inspection by other third parties or may be allowed to self-certify compliance with penalties assessed in the future if non-compliance is verified.

For private sector construction, building safety is ensured through a review of the building plans and specifications for code compliance by the applicable state or local agency, inspection of the building for code compliance during construction, a

final occupancy inspection and continued monitoring and evaluation of selected issues during the life of the building.

Now, to the questions the committee asked that I address.

Does ICC support the recommendations of the NIST study? Why or why not?

Events such as the structural failure of the World Trade Centers shake to our core our faith in the science, engineering, standards and means of ensuring building safety that we use to protect our lives, our property and our economy. The ICC, from the beginning of this investigation, has supported the work of NIST in examining the collapse of the WTC and the development of recommendations for reform of our nation's building and fire codes and standards. The NIST investigation, even as it was in process, began providing the building industry with information which has been used to develop and implement new criteria in building codes and standards. Last year, as the membership of the ICC began the process of evaluating code change proposals for publication in the 2006 edition of the codes, a proposal emanating from early understandings of the collapse was put forward, thoroughly evaluated, discussed and approved. The IBC now requires buildings of 420 feet and higher to be constructed with structural components having at least a 3-hour fire resistance rating; the previous requirement was a 2-hour fire resistance rating for structural components. These increased requirements match the changing conditions we face in providing for building and fire safety and address the public will to afford higher levels of security and protection. In making these changes it is also important to protect the integrity of the public deliberation inherent in maintaining the democratic development of voluntary consensus. We have begun to infuse post-WTC concerns into the code, and, as I will speak to in addressing the committee's other questions, the ICC has acted in support of the NIST recommendations by empanelled technical committees of member-experts to prioritize the recommendations and form them into specific proposals that can be addressed by our code development process. In addition, we are working with other groups, such as the National Institute of

Building Sciences in efforts to assess the WTC findings and to effectively develop proposals for change to the code.

Also in support of the recommendations ICC responded to NIST's request for review of its draft report earlier with extensive comments directed at assisting NIST with the clarity of its discussion and findings. The majority of NIST recommendations on the subject of codes and standards do apply to the IBC. These are noted below with a brief indication of how ICC gauges their potential applicability.

- NIST calls for more rigorous enforcement of codes. ICC believes a more appropriate term than enforcement is compliance. Enforcement is a means to achieve the goal of safe buildings, something embodied in compliance. There are other ways to secure compliance such as incentives or labeling that not only ensures the goal is reached but can secure results above and beyond simple enforcement of minimum codes and standards.
- NIST calls for well trained and managed staff and educational programs. ICC agrees and feels that NIST and other federal agencies can and should become more active in working with the private sector to develop and deploy programs that would strengthen the resources that support code compliance.
- NIST suggests an increased focus in structural issues from a design, construction, and operations and maintenance standpoint. The IBC, and referenced standards therein such as those from ASCE, provide a basis for measuring and expressing structural performance and ensuring some agreed minimum level of structural integrity in buildings.
- NIST suggests an increased focus in the fire resistance of structures and methods to evaluate and determine their performance with respect to fire. The IBC, and referenced standards therein such as those from ASTM, provide a basis for measuring and expressing building performance from the standpoint of fire resistance and ensuring some agreed minimum level of performance.

- NIST suggests increased consideration of performance based criteria as an alternate to prescriptive criteria. The IBC addresses this in two ways. In establishing minimum prescriptive criteria the IBC establishes a basis to evaluate alternative approaches to performance equivalency. The IBC also references the ICC building performance code, a stand-alone code that is completely performance-basis oriented. It is notable that NIST staff has been involved in the development of this performance-based code.
- NIST suggests development and use of new materials, coatings, barriers and other technology. The IBC addresses this by allowing acceptance of alternative materials and methods of construction when they are certified to perform at least as well as items specifically allowed in the IBC. Equivalency is based on evaluation reports developed through engineering analysis prepared by entities approved by the authority enforcing the code. As new certified materials become more commonplace standards are proposed and adopted to specifically address criteria for their application and use.
- NIST recommends improvements in active fire protection systems. The IBC and referenced standards therein, such as those by NFPA, provides a basis for review and incorporation of such improvements.
- NIST recommends improvements in building egress and evaluation. As I have discussed, the IBC provides a basis for review and incorporation of such improvements.
- NIST recommends improvements to emergency response, building access, communications and central controls. The IBC provides a basis for review and incorporation of such improvements.

On the basis of the WTC investigation NIST has made a number of recommendations to improve building safety. The IBC provides a basis to address and take action on proposals for these recommendations and, through adoption as previously noted, ensure their widespread implementation throughout the US. In this manner the NIST work on the WTC report can have a significant impact on future building design and construction.

It should be noted that the question posed by the committee is focused on the IBC, which is used to guide new construction and significant renovations to existing buildings. There is also a need to address the safety of the on-going use of our massive base of existing buildings. Through the ICC, safety requirements for these buildings are addressed through documents such as the ICC International Existing Buildings Code (IEBC) and ICC International Fire Code (IFC). Through the NFPA these issues are addressed in the Life Safety Code and the National Fire Code. Jurisdictional use of these codes, coupled with incentive programs to foster enhancement to existing buildings, can address building safety where it may not be possible to legislate renovation.

What specific steps will ICC be undertaking to determine whether and how to incorporate the NIST recommendations into its codes? How long should that process take? What will be the greatest barriers in the process?

Some of the steps associated with taking action on the NIST recommendations, as I have discussed, we have already begun. As a result of the WTC attacks and the need to consider code changes to address terrorism-related issues in the built environment, the ICC formed an Ad Hoc Committee on Terrorism Resistant Buildings. The committee – made up of code officials, engineers, architects and other building professionals, is looking at the NIST recommendations as well as other research related to responding to new threats that we now have to perpetually address. In addition, at the annual assembly of our membership last month, the ICC charged our permanent Code Technology Committee with a corresponding assignment to specifically prioritize the NIST recommendations and to prepare those recommendations as proposals for the deliberate review of our code development process. In the two days just before this hearing our Code Technology Committee has been meeting with the National Institute for Building Sciences to coordinate work in developing and preparing proposals based on the NIST recommendations.

For the next code development cycle any recommendations to revise the IBC and other ICC codes can be submitted by any party, including NIST staff or parties with whom NIST participates, on or before March 24, 2006. The recommended changes, as discussed, need to provide specific language and citations to amend the code and need to be accompanied by supporting documentation. It is our view that the information gathered and analysis conducted by NIST on the WTC collapse would prove instrumental in development of changes and supporting documentation.

As to the standards referenced in the IBC, NIST would have to take similar action with each standards developer based on individual procedures and deadlines.

The timeframe associated with the next cycle of the ICC code development process is from March 24, 2006, at which time proposed changes are due as noted above, to October 4, 2007 with the completion of the final action hearing. The result of this process will yield the 2007 supplements to the 2006 editions of each code. This process is repeated every 18 months, resulting in a new edition of the codes each three years and a new supplement each interim.

More details on this process are covered in a PowerPoint presentation presented and discussed with NIST staff earlier this year. The objective of ICC's initiative with NIST staff, in advance of release of the WTC report, was to advise NIST of the full extent of the public process or code amendment so that NIST could begin to develop a strategy for implementing the WTC report recommendations in parallel to completion of the report. In this way it was hoped NIST could develop specific codes and standards proposals prior to the March 2006 deadline. One such suggestion was for NIST to not only take the lead in development of proposed changes to the IBC and other ICC codes but also to parallel that activity by submitting those changes to federal agencies and key state and local government for early consideration for action.

The most significant barrier, as with any code change proposal, is having technical documentation for the membership to review in consideration of specific code change proposals, and the advance use of formal and informal processes of discussion and review to fully vet and analyze each proposal.

What specific actions should NIST be taking to help code organizations incorporate its recommendations? Are the recommendations framed in a way that facilitates their adoption by code organizations or are they too general or too specific?

NIST, as well as a number of other federal agencies, do already participate in the code development process through submission of and advocacy for code changes. This participation both adds to the quality of the review of all proposed code changes and helps the agencies to achieve their program goals as directed by both executive and legislative branches of government. For instance the US Department of Energy has submitted changes to the IBC in the past to more fully address the structural and fire resistance aspects of buildings associated with certain radiation-related processes. This will specifically help address DOE interests as a building owner as well as the general public. This sort of federal inter-agency coordination is precisely what is necessary for NIST to advance the recommendations of the WTC report through ICC's code development process, as well as the code and standards development of other providers of voluntary consensus standards. Another example is participation by the Consumer Product Safety Commission in realization that the ICC codes are effective vehicles to achieve CPSC's public safety goals where they may not have otherwise have rulemaking authority.

As I've discussed, the recommendations are not written in a way that facilitates direct adoption and do need to be reframed in a manner that is specific to the desired result, consistent with the statutory construction of the ICC codes, and presented in a manner that provides citation to each section and subsection of the code that is directly or collaterally impacted by the proposal; not too much unlike

the manner in which legislation this panel reviews must be framed to be consistent with the standing body of our U.S. Code. The prospects of the adoption of any recommended change to the IBC or other ICC codes cannot be addressed without seeing the details of the particular change. The nature of the process to develop codes and standards within the voluntary sector, in allowing for participation by all interested and affected parties, ensures full due consideration with respect to all views and variables.

In the simplest terms, the probability of a code change being accepted and eventually incorporated into the IBC or other ICC codes and maintained in federal, state and local adoption of those codes is dependent on the degree to which the existing code is changed, first and life cycle cost impacts associated with the change, availability of any required new technology and support infrastructure for that technology, impacts on various trade, labor and manufacturing interests, and impacts on the interests of advocacy groups, among other factors. In this manner the effects on the process are quite similar to what the legislative or executive branches go through in considering laws or regulations that impact US industry, public interests, the economy and the environment.

The ICC has recommended to NIST that, as the degree of revision associated with changes to the codes and standards increases, NIST should consider partnering with interested and affected parties in the development of codes and standards proposals as opposed to taking up the effort alone or assuming others will take the lead. In addition ICC has also stressed to NIST that without their involvement and leadership in this process there are two probably outcomes; either nothing will be done to implement the WTC findings codes and standards, or multiple and varied interests will each use the findings to their own advantage resulting in multiple, varied and non-uniform codes and standards proposals that will be much more difficult and time consuming to sort out, address and eventually agree upon.

With that said, there are some certainties associated with the process. Changes that are not enforceable or require specific products or materials by name are not

likely to be accepted, nor are changes that reference standards that have not been fully completed.

As an association comprised building regulatory and construction industry professionals who come together to establish model codes for use by the public and private sectors, the ICC is focused on building and fire safety. The ICC codes provide a platform and foundation for achieving improved building safety. The process for their revision and enhancement is open to all and affords NIST and all others the opportunity to take the results of research, investigations and studies and have them, through the wide adoption of the ICC codes, put into practice.

We at ICC applaud all the work supported by Congress, such as that conducted by NIST. We encourage continued support for such work by Congress and increasing collaboration by the public and private sectors in enhancing building performance and safety.

Thank you again for the opportunity to speak with you today. I will be pleased to answer any questions you have or provide additional information you may need.